Solution 1

(a) Rating agencies provide information on the financial risks of a firm including:

- Credit risk (default)
- Liquidity
- Earnings adequacy

- The ratings are a benchmark for public & markets to determine
- The quality and risk of particular debt issues are reported by agencies
- The rating agencies have access to inside info and are protected by Reg. FD

(b) Liquidity ratios are determined by looking at each class of assets and assigning a liquidity factor.

- Look at maturing liabilities
- Look at potential surrenderable liabilities considering features of liability
- Assess cashflows, earnings, and leverage

(c)

Category	Amount	Factor	Capital
Priv Bond (Inv Grade)	782.9	0.01	7.829
Priv Bond (Below IG)	750.8	0.075	56.31
Pub Bond (IG)	3285.5	0.002	6.571
Pub Bond (Below IG)	1737.0	0.05	86.85
CMOs	628.8	0.002	1.2576
Com Mtg (IG)	908.8	0.03	27.264
Com Mtg (Below IG)	175.5	0.06	10.53
Real Estate	842.7	0.1	84.27
Cash	36.2	0.003	.1086
Other Assets	393	0.001	0.393
Total C-1			**281.384**
Dis Reserves	640.4	0.05	32.02
Dis Prem	180	0.25	45
Life Term NAR	3000	0.002	6
Life WL NAR	1500	0.007	10.5
Total C-2			**93.52**

Solution 1 (continued)

Life Reserves	447	0.005	2.235
GIC Reserves	6658.4	0.0125	83.23
VA	379.6	0.05	18.98
Total C-3			**104.4**
L&H Prem	223.6	0.015	3.354
VAR Prod Liab	348.5	0.005	1.7425
Total C-4			**5.097**

- Required Capital = $\left(C-2^2+\left(C-1+C-3\right)^2\right)^{.5}+C-4$
- Required Capital = $\left(93.52^2+\left(281.384+104.4\right)^2\right)^{.5}+5.097=402.098$
- Capital Ratio = (Capital / Required Capital) = 1032.6 / 402.1 = 256.8%

(d)

- S&P and Moody's are much more robust
- S&P &Moody's do on-site management assessments
- Kelly's model is not regularly updated
- Kelly's model does not factor in covariances
- Kelly only uses 4 years of data vs. S&P's 5 years worth
- Kelly only reviews public information vs. others conducting onsite and accessing private information

(e)

- NRSROs must be:
  - nationally recognized
  - independent
  - have sufficiant staff
  - have systematic procedures to produce credible & accurate ratings
  - have internal procedures to protect against misuse of information

- Kelly does not meet this requirement because:
  - Not independent as fee linked to rating
  - Lack systematic procedures from using public info only and not doing on-site.

Solution 2

(a) Forms of liquidity risk

- General Definition of liquidity risk –risk of not meeting expected and unexpected cash flows at an acceptable cost
- Day-today liquidity risk – must ensures bid/ask spread is not comprised.....cash must be managed properly
- On going liquidity risk – sensitivities to rate changes in different directions making potential for liability cash flows (CFs) greater than asset CFs
- Tail risk (catastrophes) – stresses could cause large cash outflows
- rating downgrades could cause run on bank $\Rightarrow$ liquidity crisis
- if illiquid assets must be sold, will have to take a loss because cannot sell it quickly for full book value, like General American

(b)

- current position is quite poor and getting worse
- great deal of private placements and below invest grade (BIG) bonds which are quite illiquid
- Increased allocation to real estate
- no plan in place if sales of assets were needed for a run on bank

(c)

- determine time horizon – set at 1 year by management
- Get portfolio data industry par exposure, obligator data, sector/country exposure and debt class
- determine transition matrix
- transition matrix contains probability of changing credit ratings over a specified horizon
- generally use one of the rating agencies' matrices. I would recommend using Moody's or S&P's. May need to adjust for current economic environment
- Get recovery assumption data (usually bonds or rating agency data)
- Get default correlation between sectors/countries, correlations must be considered. CreditMetrics used the stock price as a proxy for firm value in Merton model. Monte Carlo is used to develop the distribution of portfolio values from whence the VAR is calculated
- Generate correlated normal variables for each exposure simulate transition matrix based on random variables
- For defaulting exposures, determine recovery

Solution 2 (continued)

(d) Zoolander has had an A- rating with negative implications two years in a row.

(i) Private placements are quite illiquid assets

- by securitizing them, the illiquid assets can be removed from books and replaced with more liquid assets
- Private placements are not transparent to investors
- Securitization involves packaging and selling asset or liability cash flows to investors in exchange for cash
- Cash could be invested in more liquid, high quality assets
- Zoolander's liquidity position could improve

(ii) Closed block of liabilities

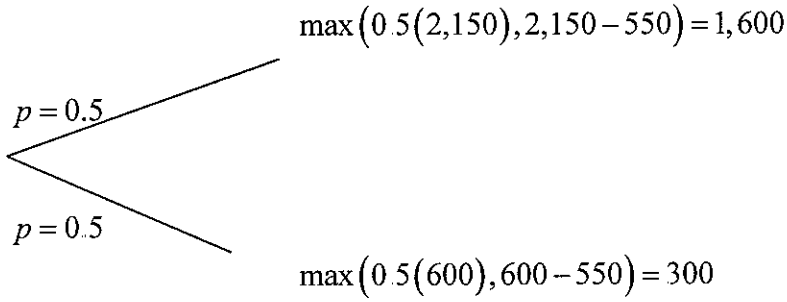
- advantages
  - receive cash to use for other hopefully more profitable activities
  - eliminate surplus strain if present
  - perhaps get a better price than reinsuring
  - decrease cost of capital because more assets and less liabilities potentially on the block
  - capitalize expected future profit a block of business
  - allows creation of "tracking securities"
  - could protect against mortality or longevity risk

Solution 3

(a) $r_{jv} = r_f + \beta_{jv}\left(r_m - r_f\right)$

$= 0.04 + 0.8(0.09 - 0.04) = 0.08$

(b) $I_0 = 600mil$



$$\text{NPV} = \sum_{t=1}^{5} \frac{(P)CF_t}{(1+r_{jv})^t} - I_0$$

$$= \frac{0.5(1,600) + 0.5(300)}{1.08^5} - 600$$

$= 46\ 55$

(c) $\pi = \dfrac{(1+r)^5 s - s^-}{s^+ - s^-}$

r = risk free rate
s= project value
s^+ = project increasing value s^- = project decreasing value

$$\pi = \frac{(1.04)^5(600) - 300}{1,600 - 300} = 0.3308$$

Solution 3 (continued)

$$\text{NPV} = \frac{\pi s^{+} + (1-\pi)s^{-}}{(1+r_f)^5} - I_0$$

$$= \frac{0.3308(2150-550) + (1-0.3308)(300)}{1.04^5} - 600$$

$$= 0.04$$

If increasing value, buy Orient Life Share, entitled to whole profit; if decreasing do not exercise the option.

$$s^{+} = \max(0.5 \times 2150, 2150-550)$$

$$s^{-} = \max(0.5 \times 600, 600-300)$$

(d)

- CCA correctly takes into account management options (to expand at the end of year 5 in this case) when calculating project NPV
- NPV uses risk-adjusted discount rate; CCA adjusts the probability of each cash flow to the risk-neutral probability, then uses risk-free rate to discount
- CCA calculates expanded NPV, while NPV is just the passive NPV
  Expanded NPV = Passive NPV + Strategic value + flexibility value
  = Passive NPV + option premium
- In the absence of managerial flexibility, CCA and traditional NPV would give the same results
- Traditional NPV uses a constant discount rate (from CAPM) applicable to a passive project. The option to expand changes the risk profile of the project, and the risk-adjusted discount rate is no longer correct.

NPV under both approaches is positive.

Solution 4

(a) Reserve methodologies and impact of changing assumptions:

US GAAP – Methodology:

UL reserves follow SFAS 97
Reserve = AV + Unearned Premium Reserve + Accrued Cost Liability + Premium Deficiency Liability
Use current best estimate assumptions, with no PADs (Provision for Adverse Deviations)
Replace estimates with actual experience as it unfolds
Revenue measure is EGPs (Estimated Gross Profits)

US GAAP – Changing assumptions:

EGPs are subject to change every accounting period
Must be trued-up to reflect actual experience
Can revise assumptions underlying future EGPs if shift in experience is believed to be long-term
Must recalculate DAC amortization and other factors each period
Use actual experience from issue to end of current period, and revised assumptions for future EGPs
Current year's earnings are affected

Canadian GAAP – Methodology:

Use current best estimate assumptions, PADs for all assumptions
Policy Premium Method used for most individual life policies – gross premium valuation
Reserve = Best estimate + PADs
Include all cash flows
UL has more complex valuation
Can hold (AV – amount for deferred acquisition expenses), or hold (AV – PV future profit margins)

Canadian GAAP – Changing assumptions:

Assumptions are only viewed prospectively
Entire impact of changing assumptions hits the current period's earnings

Australian Margin on Services – Methodology:

Reserve = Best Estimate of Liabilities + PV of Future Profits
Use current best estimate assumptions, no PADS
Spread profits as percent of profit carrier
Recognize profits as services are performed
Hold assets at fair value (market value if possible)

Solution 4 (continued)

Australian MoS – Changing assumptions:

Assumptions are only viewed prospectively

Effect is deferred to future period's earnings by adjusting profit driver

Current period's earnings are only affected in two cases:

1) Change to investment yield assumptions where policyholder not entitled to participate in investment experience
2) Previously recognized loss is reversed by a change in assumptions

(b) i. foreign exchange risks that Global has assumed

Strategic exposures – effect of change in foreign exchange rates on firm's market value

Accounting exposures – transactional and translational

Contingent exposures – effect of changes in financial prices on expected (but not booked) transactions

Competitive exposures – effect of changes in FX rates on market share and net cash flows

ii Reasons why Global might consider hedging those risks

If marginal tax rate ↑ as income ↑, hedging can reduce expected tax liability by smoothing profits

Hedging can increase firm's value by reducing likelihood of bankruptcy or financial distress

Hedging can lower agency costs resulting from management's risk aversion

iii Hedging strategies and instruments that may be used for currency hedging

Currency heading strategies:

Full hedging – Try to attain risk/return profile of local-currency investor

- Easy to implement
- Isolates local market bets from currency bets
- Neutralizes currency component of overall risk
- Doesn't consider correlations across currencies
- Requires frequent rebalancing
- No upside potential

Solution 4 (continued)

Minimum-variance (regression) hedging – Find optimal hedge ratio based on relative volatilities and historical correlation between assets and currencies

- Combines effects of asset risk and currency risk
- Minimizes overall risk of holding an asset denominated in a foreign currency
- Easy to implement when optimal hedge is found
- Need accurate forecast of volatilities and correlations

Downside (option-based) hedging

- Protect against adverse currency movements while maintaining upside potential
- Put option on individual currencies, basket of currencies, or base-currency value of portfolio

Currency hedging instruments: Hybrids

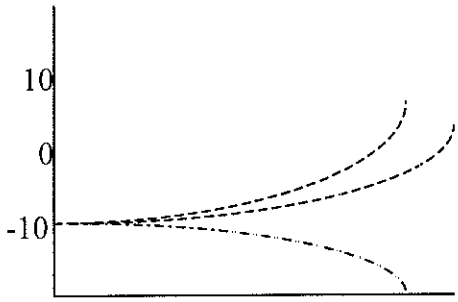
Dual-currency bond: principal and coupon in different currencies (fixed-rate bullet + long-dated forward on exchange rates)

Principal Exchange Rate-Linked (PERLs): principal paid in one currency but linked to value of another (e.g., pays dollar value of 5 million euros)

Index Currency Option Notes (ICONs): option to convert principal to foreign currency at specified exchange rate

Solution 5

(a) Should have different strategy
- instead of looking at asset volatility, should look at surplus
- should minimize surplus volatility while maximizing increase in surplus, or minimizing deficit
- can be done using tulips



- Different graphs can be made for different Betas showing potential returns for risk taken

- each line represents probability of reaching that level
  - highest line is least probable
- liability discount rate should not be tied to return on assets
- annual report should give an idea of the progression of surplus

- $R_s = \frac{A_o}{L_o} R_a - R_L$
- should look at volatility of both assets and liabilities
- should maximize surplus utility function
- should attempt to determine minimum surplus variance.

(b) Funding levels – should be appropriate
Asset risks that are not market related are alphas
- a skillful manager is needed
- law of large numbers applies

Diversify asset holding
Use standards
Proper underwriting

Solution 6

(a)

	Fair value	U.S. GAAP
Accounting	Prospective accounting	historical cost method
Acquisition expenses	n/a	deferred (DAC)
Assumptions(Life ins)	unlocked & changeable	locked – can only be charged when loss recognition event

(b) Discount rate for liabilities under CoC approach:
*Since liability flows are risky (i.e. not guaranteed), use r_A not r_f
(o/w would substitute r_f for r_A in equation below

Then $$r_L = r_A - \left(\frac{E}{L}\right)\left[\frac{r_e}{1-t} - r_A\right]$$

$$= 0.08 - (0.10)\left[\frac{0.15}{0.65} - 0.08\right]$$

$$= 0.0649 \quad \text{or } 6.49\%$$

Net cash flows after reinsurance

	2006	2007	2008
(a) Premiums (Gross x 50%)	250	245	243
(b) Expenses & commissions	75	74	73
(c) Death claims (Gross X 50%)	32	33	33
(d) Reinsurance Allowances (Gross prem x 50% x 10%)	25	24.5	24.3
Net Cashflow (a + d – b – c)	168	162.5	161.3

Since CFs assumed mid year,

$$\text{FVL} = \frac{168}{(1.0649)^{1/2}} + \frac{162.5}{(1.0649)^{3/2}} + \frac{161.3}{(1.0649)^{5/2}} = 448.50 \text{ as of Dec 31, 2005}$$

Solution 6 (continued)

(c) An alternate measure if retained would be entity-specific value

Entity-specific vs. fair value – differences:

	Rationale	Assumption	Credit standing
Fair value	Exit price	Market-based	Reflected
Entity-specific value	Orderly settlement over life of liability	Entity specific	Not reflected

Solution 7

C-3a CF considers risk due to A/L mismatch, whereas factor-based C-3a did not
Old C-3a favors interest rate risk over credit risk to get extra returns
→ leads to A/L mismatches

Old system

factor applied to assets based on asset type and credit rating → Gave C-3a RBC requirement. Size of factor varies w/risk categories of products

New system

- only for some insurers, annuity and certain single premium products
- not necessarily a bad credit thing
- forecast assets and liabilities using mandated scenarios
  look at cumulative surplus discounted
  - if use 12 scenarios, must load due to less reliability
  - if use 50 scenarios, no such penalty because greater stochastic nature → reliability of results
  - take weighting of scenarios shortfall to get required capital
  - for very good match of A/L, may lower capital requirements
  - 50%-200% of old C-3A requirement range imposed

(b) CARVM

- doesn't account for interest rate sensitivity of liability cash flows (e.g. surrenders on fixed annuities when crediting rates ↑ w/ market rates)
  If liabilities and assets backing them are mismatched, could lead to higher capital requirements.
- not enough focus on potential adverse tail events
- products have excessive options

Solution 8

(a)

i. The expected policyholder deficit (EPD) is found by looking at what scenarios would produce a loss greater than the amount of the assets and multiplying each scenario by its probability of occurring. For both DH and SH, the only scenario that produces a loss is Scenario 3 with a probability of 20%. So, the EPD for DH is $.2*(150-100)=10$, while for SH it is $.2*(100-75)=5$.

ii. The risk of insolvency is analyzed by computing the expected policyholder deficit ratio (EPDR). This is the ratio of the EPD to the expected losses of a company. The expected loss for DH is $(.2*50+.6*100+.2*150)=100$ and for SH it is $(.2*50+.6*70+.2*100)=72$ Thus, the $EPDR_{DH}$ = 10% and $EPDH_{SH}=6.92\%$ (10/100 and 5/72, respectively) Therefore, DH has a higher risk of insolvency.

iii. The target for the expected policyholder deficit risk measure is 2.5% or below. This means that IOA needs to hold enough surplus and other assets to cover its expected policyholder deficit scenarios. Let x be the additional assets. Then, for DH x must satisfy the formula $.2*(150-100-x)=0.25*$ Expected losses (11)=12.5. Therefore, x, the additional assets, is 37.5 for DH. For SH the solution for x is $.2*(100-75-x)=.025*72=16$. Thus, the amount of additional assets is 16.

iv. The capital needed is the combined existing assets and additional assets in excess of expected losses. For DH that is $100+37.5-100=37.5$. For SH it is $75+16-72=19$.

(b) Dynamic Financial Analysis (DFA) is a method of stress testing a P&C company against different economic and business cycles. The purposes of DFA are:

i. To meet competitive and regulatory pressures
ii. To understand the interplay between asset and liability cash flows and to measure the risks inherent in each
iii. To study the effect of different strategies on financial results
iv. To model the uncertainty of contingent events

DFA is used

v. To value a company or line of business for M&A purposes
vi. To assess a company in changing economic, competitive and regulatory environments
vii. For strategic planning such as for reinsurance, investment policy, claims management, ALM

Solution 8 (continued)

viii. For making tactical decisions
ix. For capital adequacy and capital allocation
x. For liquidly analysis
xi. For solvency studies
xii. For supporting discussions with rating agencies

(c) Any model developed for DFA must take into account how you want to use the model, its overall complexity, and cost. The important elements to consider are:

i. Whether to use a deterministic or stochastic model
ii. The time horizon
iii. Proper reflection of feed back loops
iv. Interrelationship with external systems
v. Whether to use a generalized model or one tailor made for the company
vi. Whether assumptions are logic driven or input driven
vii. The relationship between subsidiary and parent
viii. Scenario testing and assumption selection
ix. Model verification to history and validation
x. Commitment to keep model current with business and economic conditions

Solution 9

(a) YRT = yearly renewable term
maybe useful because its a pretty simple structure. Can be used to eliminate mortality risk. Doesn't provide sufficient surplus relief

Advantages: lower ongoing cost
low investment risks because of small amount of premium
low lapse risks

Disadvantages: only good for example for protecting against mortality risk
will not provide sufficient surplus relief unless product reinsured is also YRT
less financing provided due to small amount of premium
calculations done on a seriatim basis so transaction not simplified

Coinsurance: both reserves and assets are held with the reinsurer (2 methods)

1) Premium - Reserve plus gain required by ceding company reserve
premium does not take expense or gross premium into account

2) Premium = Reserve (R_*)
experience refund will be provided by reinsurer if good experience.

Advantage: simple transaction especially if on a quota share basis
regulators unlikely to question the validity of the agreement

Disadvantage: Asset transfer necessary to reinsurer
have to also transfer control to reinsurer
consequences for investment risk and capital gain when treaty terminated
ceding company worried about reinsurer's insolvency risk
Reinsurer must be licensed in state for ceeding company to get reserve credit

Modco Initial prem = reserve of policies reinsured
renewal premium = % of gross premiums
experience refund may occur
reinsurer will provide initial expense allowance
Both assets and reserves are held at the ceding company

Modco adjustment set up = Terminal R_x -Initial R_x + Investment
if adj> 1 Reinsurer owes the ceding company

Solution 9 (continued)

if adj <1 ceding company owes the reinsurer

Advantages: Reinsurer can deduct entire reserve increase from corporate taxes
don't have to worry about reinsurer insolvency
no transfer of assets required
don't have to worry about reinsurer licensed in state
Reinsurer may not want to invest the assets
works with any kind of product (insurance)

Disadvantages: Complicated transaction due to Modco adj and death and surrender adjustments
Reinsurer may prefer coinsurance so don't have to worry about ceding company insolvency

(b)

i. Because term is relatively simple product, I would recommend coinsurance. Easy to set up → will get surplus relief that is desired. Modco would also work but would be a little too complicated for term.

ii. For UL I would recommend Modco because it works with any product. Assets and reserves are held and control doesn't have to be transferred to reinsurer and you needn't worry about companies insolvency and you get reinsurance credit for risk assumed.

(c) tax benefits: If a company wants to offset its taxable losses with gains. May want to protect or use up loss carry forwards. Money (gains) provided by reinsurance can be offset against losses.

Strategic uses: capital utilization
income management
assumption reinsurance when entering or leaving a unit
provide financial assurance in leveraged buyout

Solution 10

(a) Tangible Value (TV) = Bood Value (BV) + Premium over book
Book Value = Assets – Liabilities = 225-160 = 65 million

P/E Ratio = $\frac{\text{Price}}{\text{Earnings}} = \frac{1}{K}$ with no debt = 1/.1=10

P/E Ratio = $\frac{\text{TV-D}}{\text{E-iD}}$ D=Debt=0, E=Earnings, i=cost of debt =10=$\frac{\text{TV}}{7.5}$, TV=75mil.

(b) New Debt = 25
Tangible Value post new developement and debt = 100
Hit to earnings = 2.25
Earnings = 7.5 + 7.5 – 2.25 = 12.75
P/E = 100/12.75 = 7.84

(c) Using a higher tax rate will lower the franchise P/E.

By inspection of the formula $\left[\frac{R-K}{\left[r/(1-t)-ih\right]\cdot k}\right]$

by increasing t (taxes) the denominator will get bigger thus lowering the franchise P/E

(d) This statement is correct. Franchise investments allow for a high P/E ratio. Adding debt can increase or decrease the base P/E slightly. However only high P/E's can be sustained through significant franchise investments.
M&M proposition states that the firm's value can only be changed by altering cash flows from taxes, transaction costs, or actual investment decisions. Financial Structure cannot manipulate a firm's value

Solution 11

(a)

(i) Structure is 100% equity/0% debt
Acquiring company would not have to pick up debt payments

(ii) Zoolander has diversified product portfolio
Acquiring company might see synergies (e g distribution channels, product expertise)

(iii) Kelly memo states that ROE is too low
Low ROE might invite takeover

(iv) Company management vacations together, etc., creating perception of cronyism
Bonus program does not encourage proper behavior, such as putting profitable business on the books or keeping expenses down
Stock option program has large gap between senior managers and others

(b) Lyon Enterprises holds 49% of stock
Significant (though not majority) voting rights could make it difficult to acquire through hostile take over
Further steps

- Increase debt (0% debt ratio is inviting takeover)
- Implement poison pill
- Improve bonus formula to encourage profitable behavior

(c) Advantages

- Higher debt reduces agency cost of debt
- Interest payments may receive favorable tax treatment
- Leverage-increasing events often lead to stock price increases
- Current low interest environment = low cost of debt

Disadvantages

- Increased potential for bankruptcy
- Possible debt covenants could restrict future operations
- Rating agencies may not view higher debt favorably

(d) $h_{\max} = \left(ROA - SD_A * Z_k - ROE_{\min}\right) / \left(i - ROE_{\min}\right)$
where i = cost of debt = 5%
For 90% confidence level, $Z_k = 1.282$
$h_{\max} = \left(15\% - 10\% * 1.282 - 0\%\right) / \left(5\% - 0\%\right) = 43.6\%$
This is higher than 30% target, so target is reasonable for given target ROE
Note that, since current debt level is 0%, ROA –ROE = 15%target

Solution 11 (continued)

(e) $D_j + S_j = \$1.2$ billion

$D_j = 30\% \times 1.2B = \$360$ million

$S_j = \$1,200$ million - \$360 million = \$840 million

Target ROE = $\rho_e + (\rho_e - 1) * D_j / S_j$, where ρ_e = equity cost of capital = 11%

Solve $15\% = 11\% + (11\% - i) * (360/840) \rightarrow i = 1.67\%$, which is a low cost for debt financing, so 15% target ROE appears to be too high

For i = 5% (firm's ;pmg-term cost debt), target ROE becomes 13.6%

For 40% debt ratio, target ROE is 15% with i = 5%

(f) Current debt ratio of 0% is inviting a takeover, so company should increase it

Above calculations suggest that a 40% target debt ratio is most appropriate for given target ROE and current cost of debt

This is very close to maximum debt ratio of 43.6% for 90% confidence level

Rating agencies and potential creditors might be opposed to increasing debt ratio, so consider phasing debt in over next few years

Ways to deploy excess captial

- Repurchase shares with excess capital
  - Return some capital to shareholders
- Increase dividends
  - May increase market value, but not tax effective
- Invest in a partnership
  - No additional tax liability

Solution 12

(a) The question contains all necessary date for calculating distributable cash flow
The 3 components of actuarial appraisal value are:

a. statutory net worth
b. embedded value or a. + value of inforce business
c. Actuarial appraisal value or b + value of future business

(b) Desired WACC 30% debt at 5%
Cost of Equity 11%
WACC=9.20%

	Distributable Cashflow
12/31/2005	267+226-2-100-30-9-(3763-3500)-8-(169-157)
12/31/2006	268+243-7-101-32-9-(4045-3763)-9-(182-169)
12/31/2007	270+261-5-101-35-9-(4348-4045)-9-(196-182)

	Discounted at WACC
12/31/2005	63.19
12/31/2006	48.64
12/31/2007	42324

Actuarial Appraised Value: 154.06

(c) M&A activityis driven by the overall M&A market and financial strategic considerations
Financial considerations:

- Primary objective is corporate growth (revenue and/or earnings)
- Often require expense savings or revenue synergies (Can ABC's independent brokers be used to sell other products?)
- Does market value Zoolander's earnings more than ABC Annuity's?

Strategic considerations:

- Horizontal integration. Zoolander has Variable annuities. Is there geographic integration, is ABC's business in another region?
- Vertical integration. Zoolander is gaining access to brokers selling for ABC.
- Zoolander increases VA block of business to achieve better diversification.

(d) Public Offering
Probably not appropriate. Like IPO however security issue is not the first that a firm is undertaking
Expensive in term of cost (5-10% of issue), senior management involvement and time to get funding.
Equity issue would entail dilution of existing ownership claims.

Solution 12 (continued)

Public issued debt
Appropriate source of financing given timing and payback period
Less expensive than equity in terms of cost and senior management involvement provided transaction is of adequate size
Perhaps entail restrictive covenants. Would increase risk of equity claims.

Internal capital / retained earnings
Internal capital is an appropriate source of financing for Zoolander as they are currently sitting in over-capitalized position. However, it is difficult for most firms to finance an acquisition solely using internal capital unless the acquisition is relatively small and/or the amount of idle capital is excessive.
No cost to using internal capital and quickest method of getting funding.
No change to ownership claims

Solution 13

(a) Since both bonds have same risk profile, one can make the investment decision by simply comparing the after tax return of the two bonds, on an annual basis:

After-Tax Return of Bond #1 = R1 =

Probability of no taxable income X After-Tax Return of Bond without taxable income
+ (1-Probability of no taxable income) X After-Tax Retund of Bond with taxable income =

$$0.6 \times 8\% + 0.4 \times 8\% \times (1 - 30\%[\text{marginal tax rate}]) = 7.04\%$$

After-Tax Return of Bond #2 = R2 = 6%

Therefore, since R1>R2, choose Bond #1 which generates higher after-tax return than Bond #2.

(b) Similarly, @ time 1,
Probability of no taxable income X After-Tax Return of Bond without taxable income
+(1-Probability of no taxable income) X After-Tax Return of Bond with taxable income =

Annual After-Tax Return of Bond #1 @ time 1 = 0.1 x 8% + 0 9 x 8% (1-30%[marginal tax rate])=5.84%

Annual After-Tax Return of Bond #2 @time 1 = 6%

Therefore, transaction cost which will make investor indifferent switching from Bond #1 to Bond #2 would be:

Annual After-Tax Return of Bond #2 @ time 1 – Annual After-Tax Return of Bond #1 @ time 1 = 6% - 5.84% = .16% or 16 basis points on an after tax basis

On a pre-tax basis,
16 basis points = .1 x pre-tax transaction cost + .9 x Pre-tax transaction cost x (1-30% [marginal tax rate])
=>Pre-tax transaction cost = 22 basis points

Solution 13 (continued)

(c) If risk profiles of the two bonds were no longer the same,
- After-Tax returns adjusted for risk level need to be used for comparison
- Otherwise, comparing apples and oranges

- Should take account of probabilities of paying full/partial/no tax when risk-adjusted return is calculated

Solution 14

(a) Signaling Model

- firms with strong prospects pay high dividends to separate themselves from other firms
  - signals confidence in earnings
  - Outcome: price increases compared to competition
    Results in separating equilibrium which is both stable and efficient

Agency Cost / Contracting Model

- Manager pay dividends to show they are not investing in negative or zero NPV projects
- convey information through dividends to overcome information asymmetry
- stock price increased because management is giving back excess cash flows
- A dividend policy creditably commits firm managers to a value maximizing strategy
- Dividends immediately taxed: may make firm less attractive to institutional investors who prefer growth

Comparison - Both models predict stock price increase. Agency model predicts changes in management behavior while Signaling model would not

(b)

Increases in firm specific factors	Impact on Dividends
Growth Rate	-
Number of owners	+
Investment opportunities	-
Size of largest shareholder	-
Free Cash Flows Generated	+
Return on Assets	-
Size of company	+
Industry	mature +
Capital Intensity	-
"Tightness" of ownership coalition	-
Size of largest bloc holder	-
midsized company	not support Div
publicly traded corp	support
20 yrs existence	support
stabalized growth	support
consistent profits	support

Solution 14 (continued)

(c) I recommend paying a dividend that expected earnings can support. Set initial dividend at a modest level that is easy to support.

- industry growth has slowed – don't need excess CF
- stable earnings support, dividends
- improve stock price, overcome information asymetrics in the market

Solution 15

(a) EVA = Post Tax ROA – Cost of Capital
Annuity EVA = (9%)(1-30%)(100)-7%)(1-30%)(90)-(13%)(10)=0.59
Life EVA = (10%)(1-30%)(100)-(9%)(1-30%)(70)-(13%)(30)=-0.33
DI EVA = (11%)(1-30%)(100)-(7%)(1-30%)(50)-(13%)(50)=-1.25

(b) Annuity ROA = 5.71/70=8.16%
Life ROA = 7.33/70=10.47%
DI ROA = 8.95/70=12.79%

(c) Advantages
- Eva is consistent performance measure across lines of business
- EVA not easily manipulated
- Results in decision making which reflects effective use of capital
- When used to measure management performance
  → simulates ownership for management – no cap to upside
  → self financing bonus
  → eliminate budget sandbagging

Disadvantages
- may sacrifice long term profit for short term gain
- not a risk adjustment measure